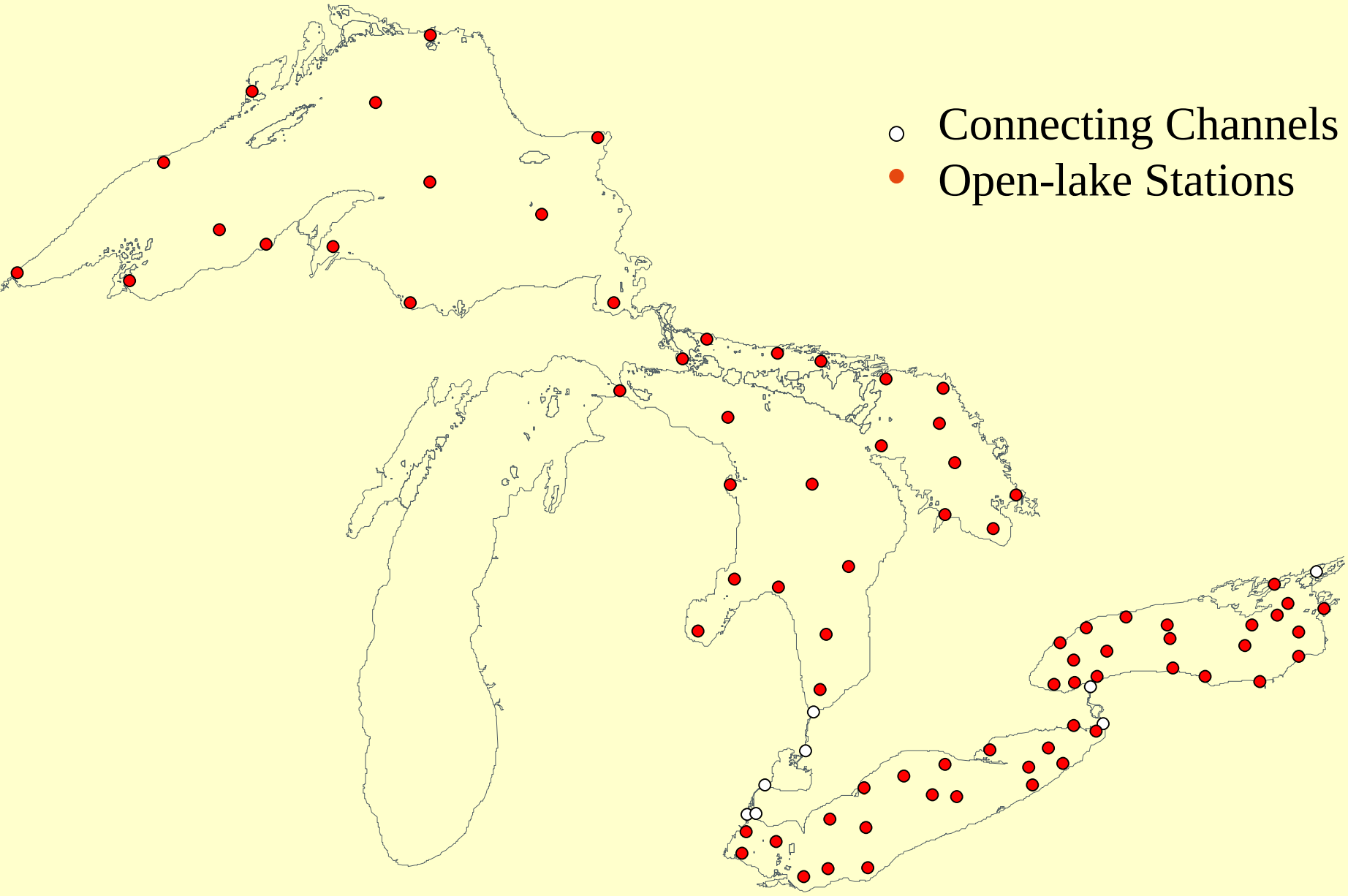
Contaminant Monitoring in the Great Lakes

Water and Sediments

A multi-agency perspective

Environment Canada Water

- Open-lake sampling on-going since 1986
  - Ontario, Erie, Huron, and Superior
- St. Clair, Niagara River and St. Lawrence River since 1986; Detroit R. since 2000


Connecting Channels
Open-lake Stations

Analyte List

Organochlorines

DDT +
Heptachlor
Endosulphan
Chlordane
αBHC/Lindane
Mirex
Aldrin/Dieldrin
PCBs
OCS
HCBD
HCB

PAHs

Anthracene
Benz(a)anthracene
Benzo(a)pyrene
Chrysene
Benzo(b/k)fluoranthene
Naphthalene
Dibenzo(ah)anthracene
Fluoranthene
Pyrene
Fluorene
Phenanthrene
Indeno(123-cd)pyrene
Benzo(ghi)perylene

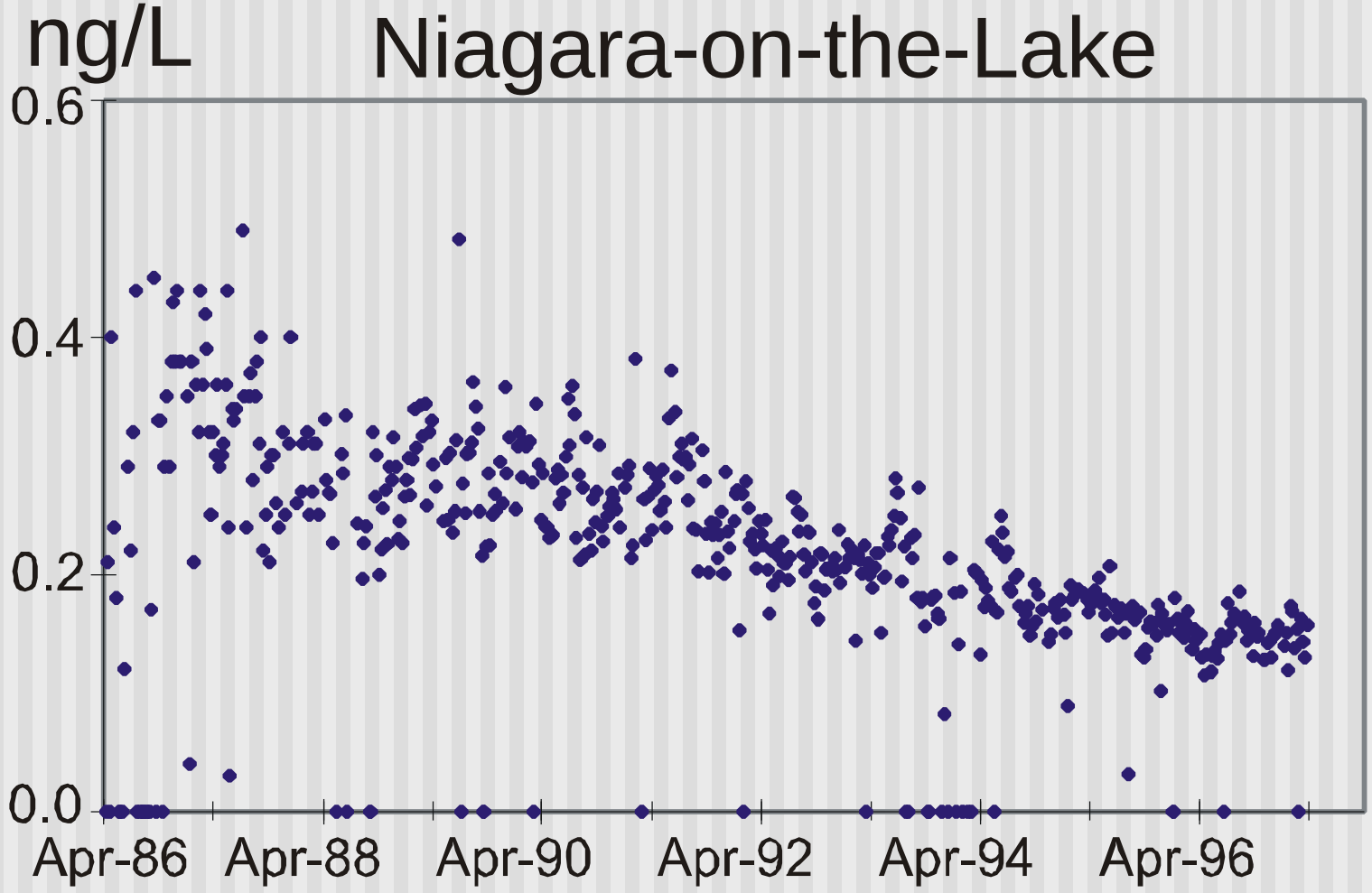
Metals

Aluminum
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Zinc

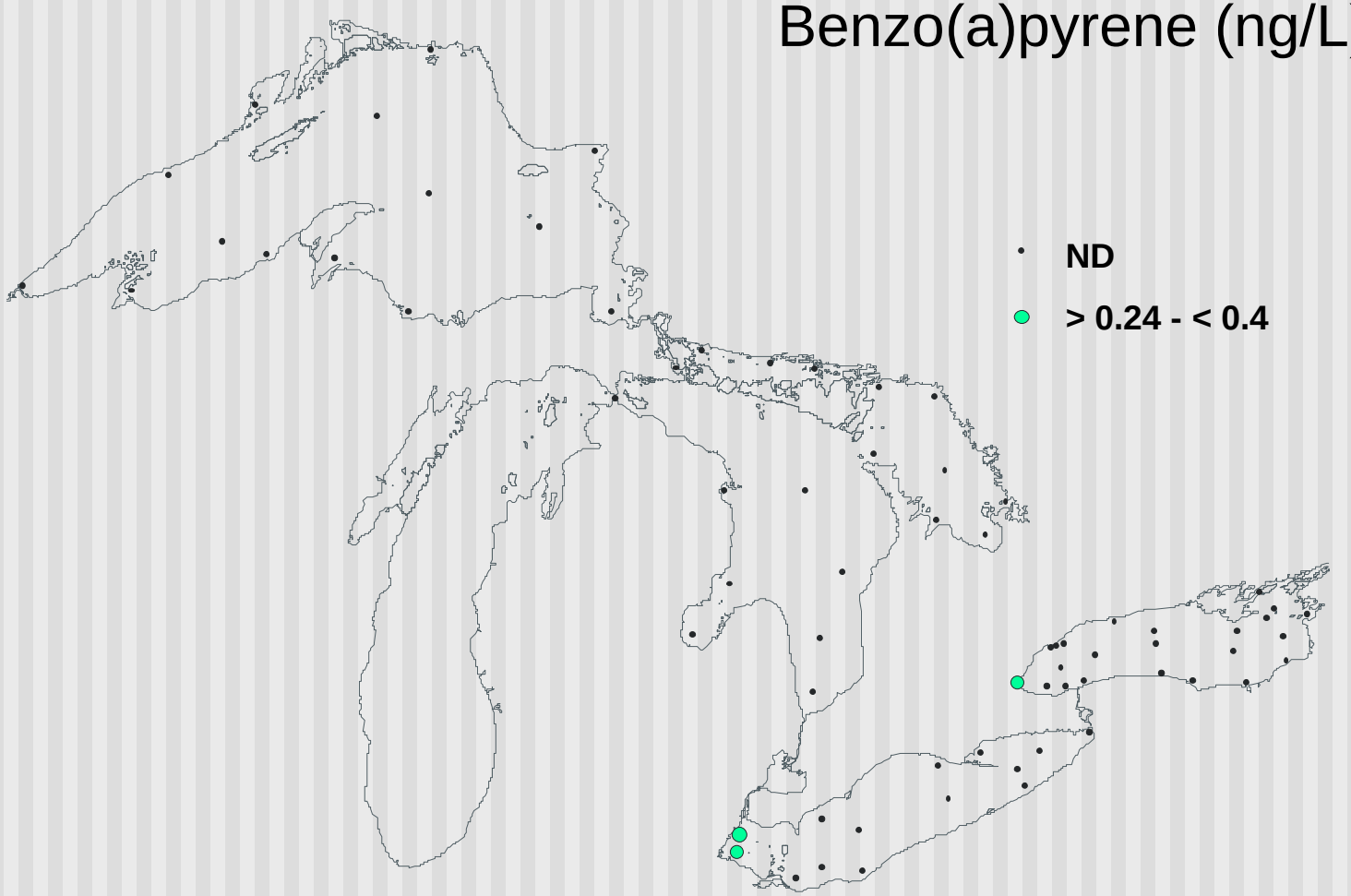
General Observations

- Concentrations and loads of most toxics have dropped at least 60% since 86.
- Lindane and Dieldrin ubiquitous, similar concentrations
- BaP, HCB, OCS, DDT and Mirex patterns suggest localized sources

Dieldrin Concentrations over time



Benzo(a)pyrene (ng/L)

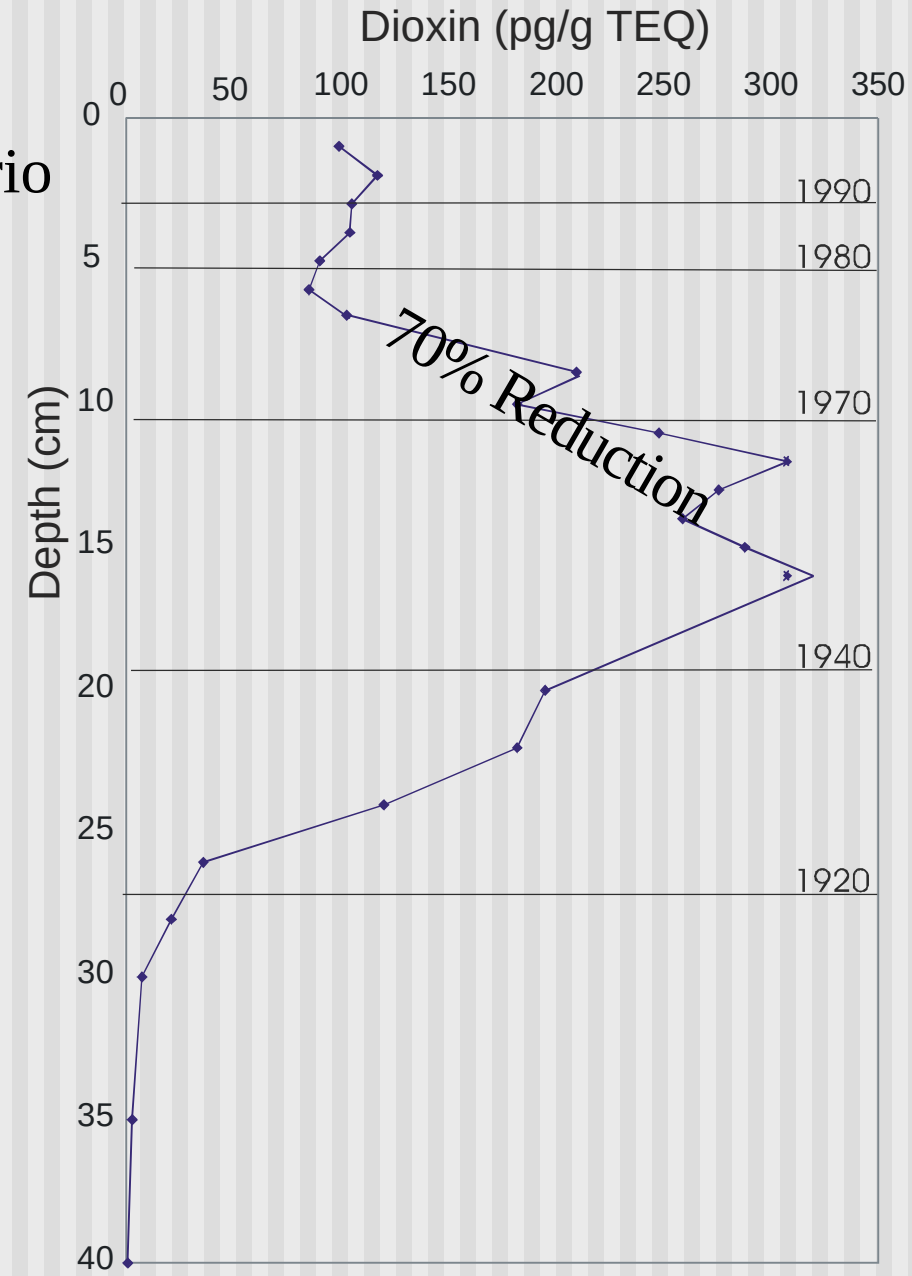


New York’s Water Quality Standard = 1.2 ng/L

Environment Canada Sediments

- 25 Year Retrospective
  - Surficial spatial and temporal comparison
  - 1997-2002 spatial surveys compared to 70s
  - Sediment cores
- Organochlorines, PAHs, metals, Dioxin /furans, and “emerging” chemicals in selected locations (PCA, PCN, PBDE, Toxaphene, Dioxin-like PCBs)

Lake Ontario



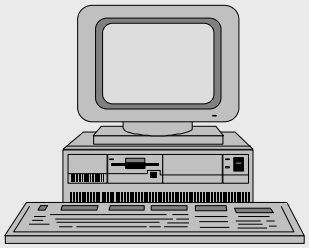
Ontario MOE

- Great Lakes Nearshore Monitoring and Assessment Program (multi-media)
  - Great Lakes Index Station Network
  - Great Lakes Tributary Toxics Monitoring
  - Great Lakes Toxics Biomonitoring

The GLNPO Sediment Assessment and Remediation Team

Supporting Contaminated Sediment Work In Great Lakes AOCs

Technical



Field

Financial

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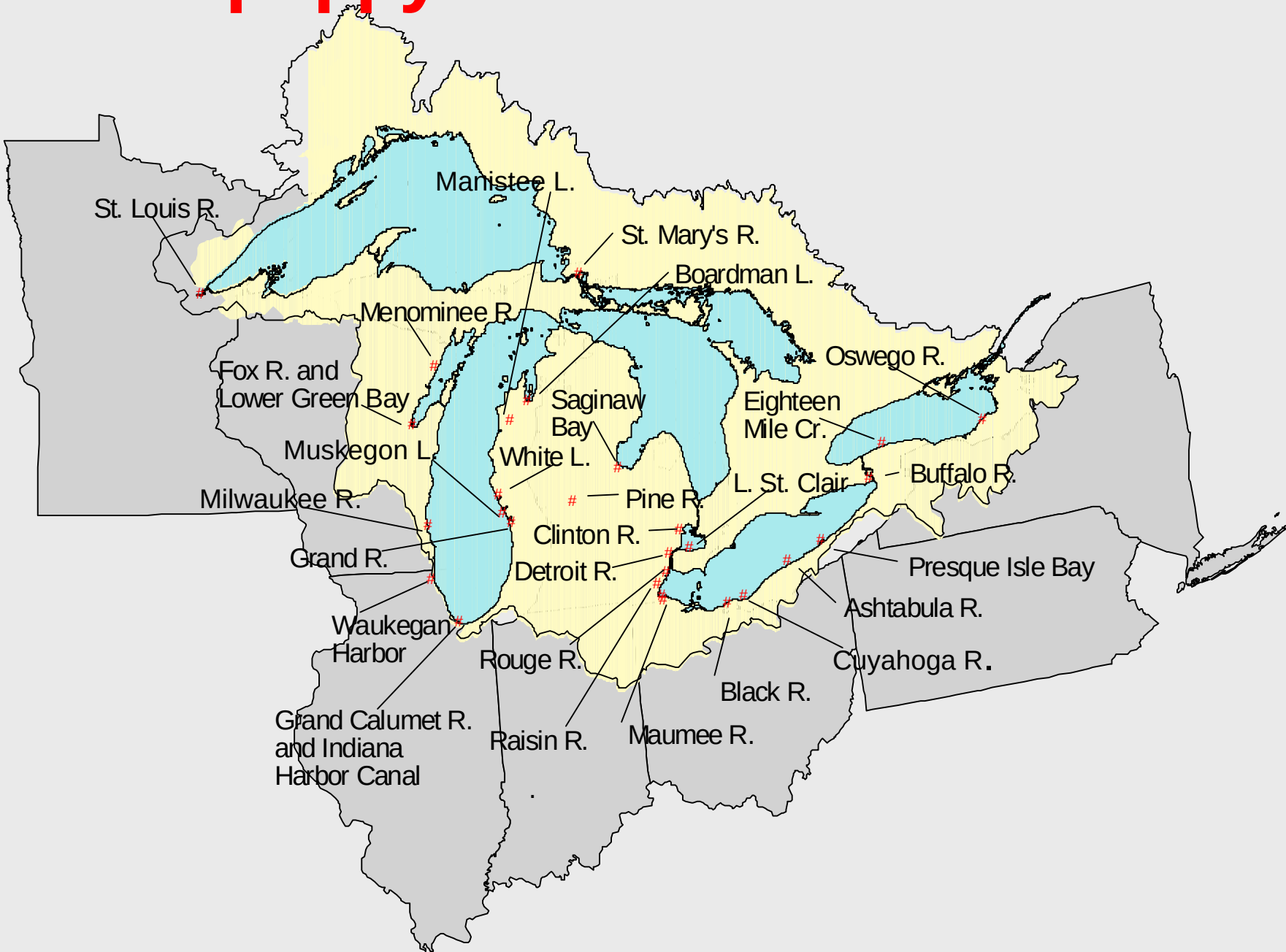
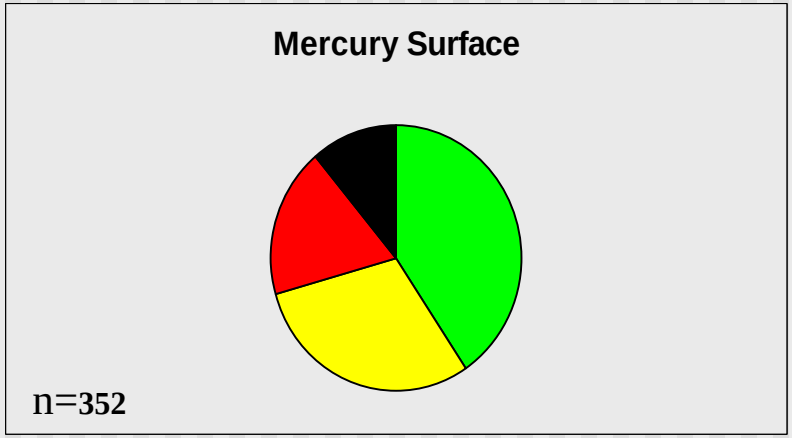
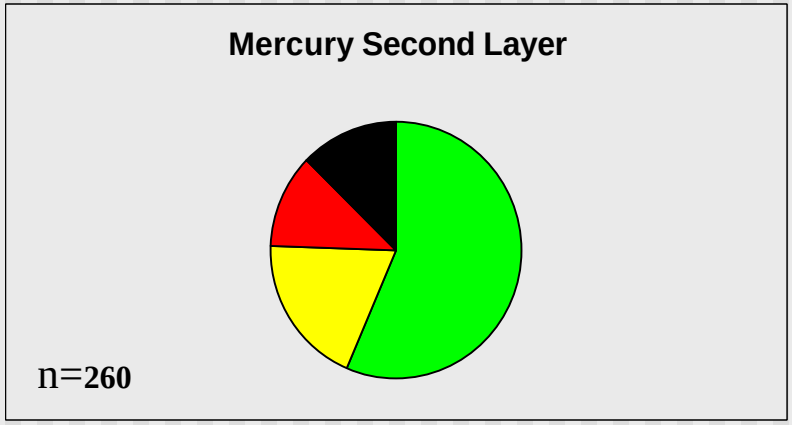
R/V Mudpuppy Sediment Assessments



The *R/V Mudpuppy* in Action

COMPARISON OF SURFACE RESULTS TO SECOND LAYER RESULTS FOR 10 TRIBUTARIES AND HARBORS – MERCURY





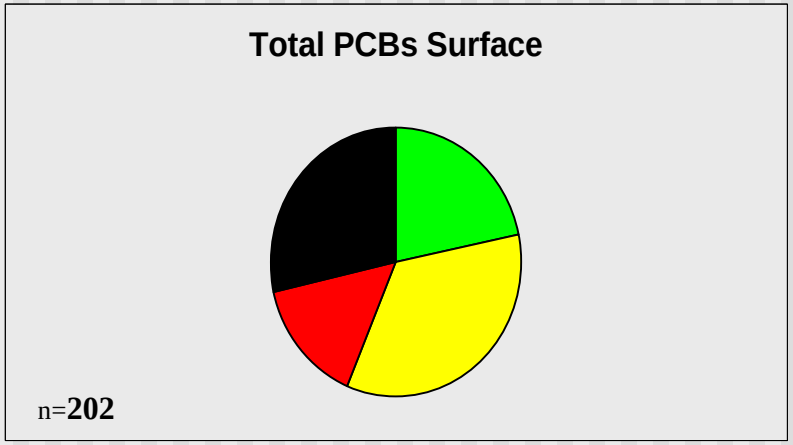
Most likely toxic

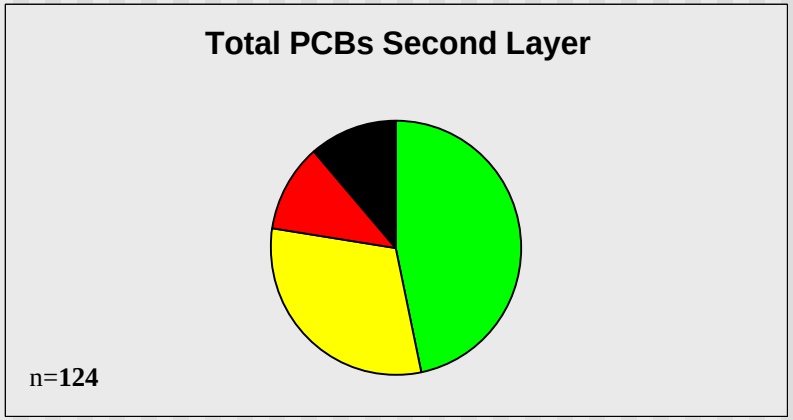
Probably toxic

Toxicity uncertain

Probably not toxic

COMPARISON OF SURFACE RESULTS TO SECOND LAYER RESULTS FOR 10 TRIBUTARIES AND HARBORS – TOTAL PCB





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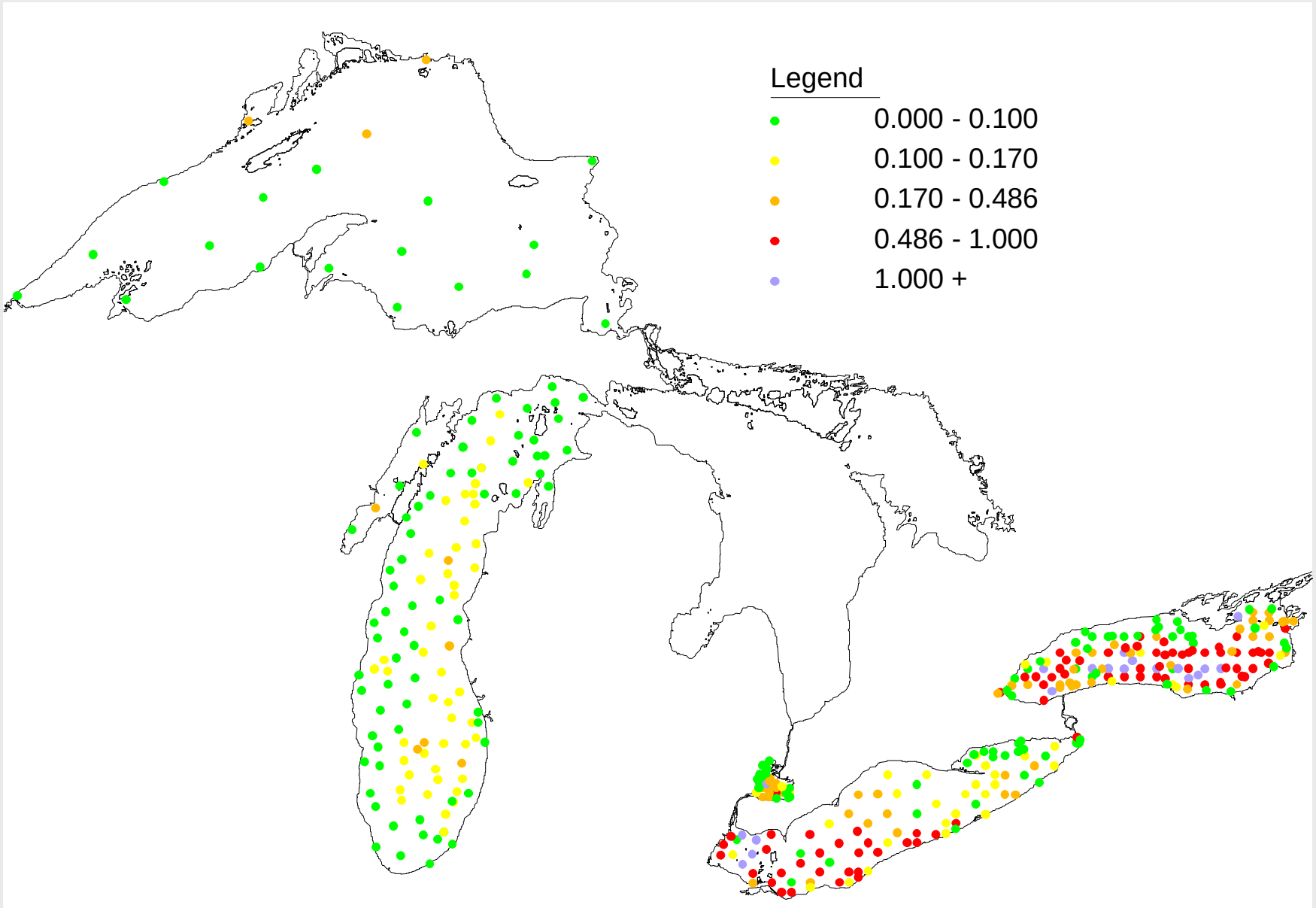
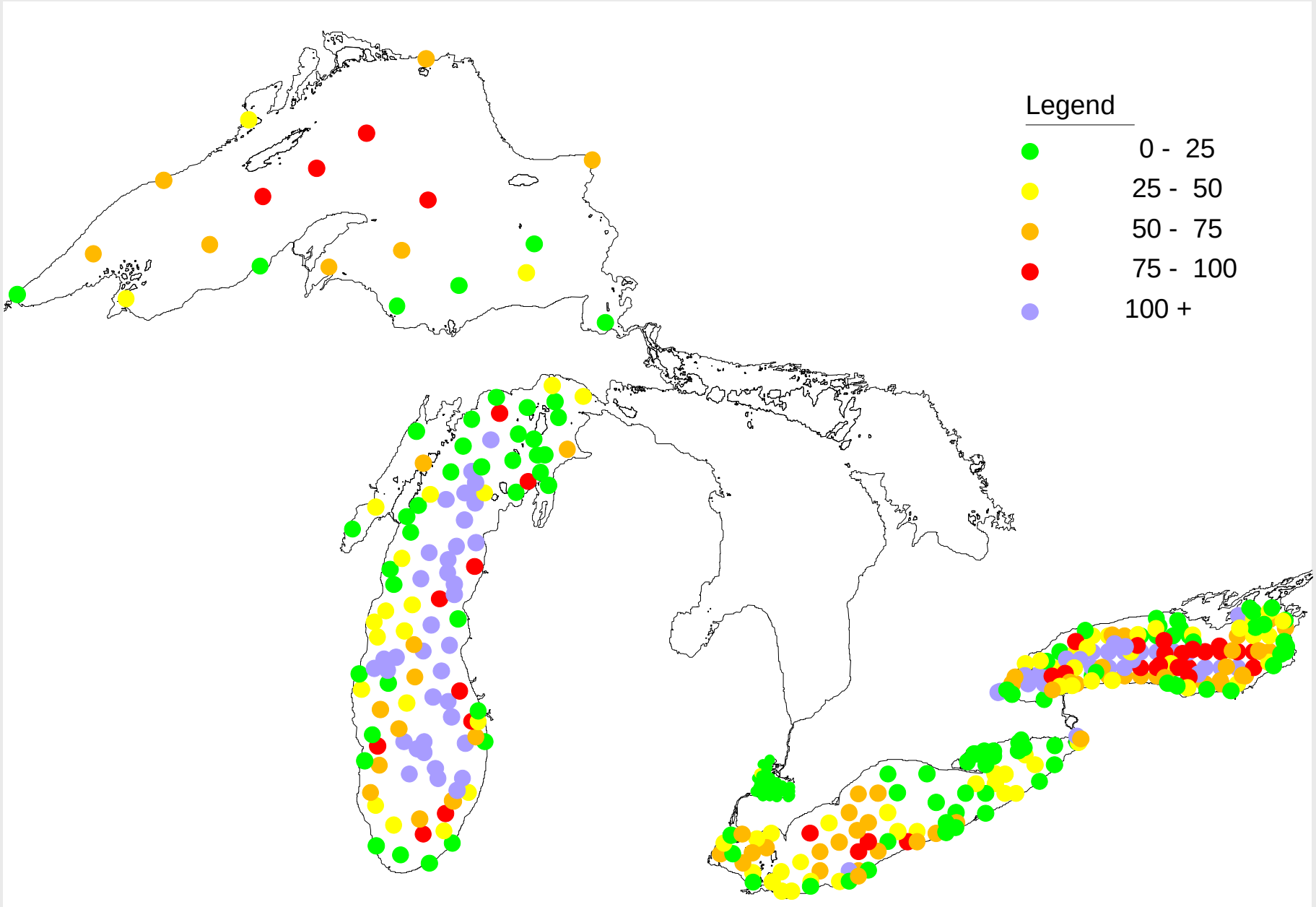
EPA Region 2 and NYSDEC

- NYSDEC Rotating Intensive Basin Studies
  - Every 5 yrs, bioassessment, water and sediment chemistry
  - Sediment characterization special projects
  - Contaminant Trackdown
- EPA 1997 & 2003/4 Lake Ontario Study

Mercury in bottom sediments (ppm)



Lead in bottom sediments (ppm)



Dioxin Spatial Patterns